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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/402,751	10/12/1999	HENNING HENNINGSSEN	4359-5-PCT	6390

22852 7590 06/03/2005

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EXAMINER

LIANG, REGINA

ART UNIT PAPER NUMBER

2674

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/402,751

Applicant(s)

HENNINGSEN, HENNING

Examiner

Regina Liang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The disclosure is objected to because of the following informalities: on pages 3-10 of the specification, claim numbers should be deleted from the disclosure since the claim number can be changed in the future.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 7 recites the limitation "said at least one light source" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitation "the rod" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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5. Claims 1, 3-5, 8, 14, 15, 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Gulick (US. PAT. NO. 5,838,865).

As to claim 1, Fig. 6 of Gulick discloses an illumination unit having a plurality of light emitters comprised of light guides (bundles 76A-76D) arranged to illuminate an illumination face (70) via a light valve arrangement (LCD array 80A-80D). Gulick teaches each LCD array (80A for example) having a plurality of pixels (this corresponds to a light valve arrangement comprising a plurality of electrically controlled light valves), and each light guide (e.g., 76A) being arranged to illuminate a plurality of light valves (plurality of pixel in each LCD array).

As to claim 3, Gulick teaches a micro lens (84A-84D) arrange between the light valves (LCD) and the illuminations face.

As to claim 4, Gulick teaches the optical light comprises optical fibres (62 shown in Figs. 4 and 5).

As to claim 5, Figs. 2 and 3 of Gulick teaches the light source comprising a short arc gap lamp.

As to claim 8, Fig. 3 of Gulick teaches a collimation lens (relay lens 34) arranged between the light emitter and the face shape of the light valves.

As to claim 14, Fig. 6 of Gulick teaches a optical means (lens 84) is provided between the light valve arrangement (80) and the illumination face (70).

As to claim 15, Gulick teaches the LCD light valves.

As to claim 18, Gulick teaches light guides are arranged with respect to the light valve arrangement such that the optical energy of each area of light valves does not differ significantly from each other (see Fig. 6).

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As to claim 19, Fig. 3 of Gulick teaches light receiving ends of the light guides (64) are gathered in one bundle which directly receives light from a reflector 26 optically connected to the lamp (30).

As to claim 20, Gulick teaches one light emitter or light guide (76A-76D) illuminating a plurality of light valves (pixels array).

6. Claims 1, 4, 7, 15, 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Au (US. PAT. NO. 5,608,833).

As to claim 1, Figs. 2- 4 of Au discloses an illumination unit having a plurality of light emitters (light beams 20 and image plane 13) comprised of light guides (fiber array 12) arranged to illuminate an illumination face (the face of prism 44) via a light valve arrangement (light valves 32). Au teaches the light valves having a plurality of individual image pixels (this corresponds to a plurality of electrically controlled light valves), and each light emitter being arranged to illuminate a plurality of pixels (see Fig. 3).

As to claim 4, Au teaches the illumination unit comprising a plurality of optical fibres (Fig. 4).

As to claim 7, Au teaches the light source comprises a laser source (col. 2, lines 64).

As to claim 15, Au teaches a LCD light valves.

As to claim 18, Au teaches light guides are arranged with respect to the light valve arrangement such that the optical energy of each area of light valves does not differ significantly from each other (see Figs. 2, 3).

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As to claim 19, Figs. 1 and 2 of Au teaches light receiving ends of the light guides (24) are gathered in one bundle which directly receives light from a reflector (10 or 30) optically connected to the light source.

As to claim 20, Fig. 3 of Au teaches one light emitter (20 or 30) having a plurality of light guides (12) illuminating a plurality of light valves (32).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gulick.

Gulick discloses the illuminating unit comprising a short arc gap lamp. Gulick does not disclose the short arc gap lamp comprises light receiving optical light guides arranged with an angle of $\pm 75^{\circ}$ with respect to the equatorial axis of the lamp. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gulick's short arc gap lamp to have light receiving optical light guides arranged as claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

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9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gulick in view of Shibuya et al (US. PAT. NO. 4,619,508 hereinafter Shibuya).

As to claim 7, Gulick does not disclose the light source comprising a laser source. However, Shibuya teaches an illuminating optical device which uses a coherent light source such as a laser (1 in Fig. 1). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the light source of Gulick to have a laser source as taught by Shibuya since the laser light source can accomplish illumination excellent in uniformity (col. 1, lines of Suganuma).

10. Claims 2, 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gulick in view of Mizuguchi et al (US. PAT. NO. 5,548,349 hereinafter Mizuguchi).

As to claims 2, 21, Gulick does not disclose the illumination unit having one micro lens arranged with respect to each light valve. However, Fig. 2B of Mizuguchi teaches a pixel arrangement of a display device comprising micro lens arrays (e.g., 6), each of micro lenses (6a) constituting the micro lens array has a size equal to one pixel (15) of the LCD panel (14). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the illumination unit of Gulick to have one micro lens arranged with respect to each light valve as taught by Mizuguchi since an excellent picture can be obtained.

As to claim 22, Fig. 6 of Gulick teaches a second micro lens arrangement (84A-84D) arranged between the light valves (80A-80D) and the illumination face (70).

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11. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gulick in view of Tanaka et al (US. PAT. NO. 5,633,737 hereinafter Tanaka).

As to claim 9, Gulick does not disclose face shape of the light valves forms one or more hexagons. Fig. 3c, of 3d of Tanaka teaches the light valves (LCD layer) having hexagonal micro-lenses such that the face shape of the light valves (pixels) forms one or more hexagons. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gulick to have hexagon shapes formed on the face shape of the light valves since this arrangement make it possible to reduce the angles made between the incident light beams of the respective colors and the optical axis of the micro-lens, thereby reducing the aberration of the micro-lens array.

As to claim 10, Fig. 3 of Tanaka shows that the pixels in the second row are offset from the first row (this corresponds to the light valves being disposed at a given mutual distance, and the rows being mutually offset in the transverse direction).

As to claim 11, Figs. 1a, 2, 4, 7 of Tanaka teaches the projection of all the individual light valves in the display screen.

12. Claims 12, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gulick in view of Dwyer, III (US. PAT. NO. 5,281,960).

As to claim 12, Gulick teaches each of bundles (76A-76D) is illuminating the face shape of the light valves (the output end of each bundle corresponds to the illumination head). Gulick does not disclose the illumination head and the illumination face is adapted to perform a relative movement across an illumination area, and a control unit for controlling the light valves in

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dependence on the relative movement between the illumination head and the illumination face. However, Dwyer, III teaches a display device for generating an image on the display having a plurality of light sources (Fig. 2), the pixels provided by the light sources are imaged on the display upon a fiber optic bundle. Dwyer, III also discloses the device comprising an actuator for controlling the relative movement between the array of light emitting points from the fiber optic bundle and the illumination face, and the actuator relies upon the successive selection of apertures within a light valve cell to pass light from an image source (see Fig. 2, 6, 20, 21, and col. 15, lines 44-49, col. 22, line 66 to col. 23, line 68 for example). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gulick's illumination unit to perform a relative movement between the illumination head and the illumination face and have a control unit for controlling the light valves as taught by Dwyer, III, since the apparent resolution of the displayed image is increased without increasing the resolution or size of the display source used to generate the image (col. 4, lines 57-60 of Dwyer, III).

As to claim 13, Figs. 12 and 13 of Dwyer, III shows the movement of the light emitting point through a succession of positions (this corresponds to illumination system movable relative to the illumination face in a single progressing movement transverse to a direction).

13. Claims 16, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gulick in view of Lee (US. PAT. NO. 3,553,364).

Gulick does not disclose the light valves comprising electromechanical light valves. Lee teaches a electromechanical light valve device relating to light transmission or light reflection

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control, and more particularly to a light valve for controlling the transmission or the reflection of light by means of an electrostatic charge. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the light valves of Gulick to comprising an electromechanical light valves as taught by Lee so as to provide a light valve isolated from surrounding electrostatically generated forces, thereby reducing "crosstalk". (col. 1, lines 35-36 of Lee).

14. Claims 2, 3, 5, 6, 8, 14, 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Au in view of Mizuguchi (US. PAT. NO. 5,548,349).

As to claims 2, 21, Au does not disclose the illumination unit having one micro lens arranged with respect to each light valve. However, Fig. 2B of Mizuguchi teaches a pixel arrangement of a display device comprising micro lens arrays (e.g., 6), each of micro lenses (6a) constituting the micro lens array has a size equal to one pixel (15) of the LCD panel (14). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the illumination unit of Au to have one micro lens arranged with respect to each light valve as taught by Mizuguchi since an excellent picture can be obtained.

As to claims 3, 22, Fig. 1 of Mizuguchi teaches a micro lens (8 or 9) arranged between the light valves (7) and the illumination face (10).

As to claim 5, Fig. 1 of Mizuguchi teaches the light source comprising a short arc gap lamp.

As to claim 6, Au as modified by Mizuguchi does not disclose the short arc gap lamp comprises light receiving optical light guides arranged with an angle of $\pm 75^\circ$ with respect to

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the equatorial axis of the lamp. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the short arc gap lamp of Au as modified by Mizuguchi have light receiving optical light guides arranged as claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

As to claim 8, Au teaches the illumination unit having a collimated lens (10) between the light emitter and the face shape. Mizuguchi teaches a first micro lens arrangement (5 and 6 in Figs. 2) associated with the plurality of light valves (14).

As to claim 14, Fig. 1 of Mizuguchi teaches an optical means (8 or 9) arranged between the light valve arrangement (7) and the illumination face (10) for spreading the light beams across the illumination face.

15. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Au and Mizuguchi applied to claim 8 above, and further in view of Tanaka et al (US. PAT. NO. 5,633,737 hereinafter Tanaka).

As to claim 9, Au as modified by Mizuguchi does not disclose face shape of the light valves forms one or more hexagons. Fig. 3c, of 3d of Tanaka teaches the light valves (LCD layer) having hexagonal micro-lenses such that the face shape of the light valves (pixels) forms one or more hexagons. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Au as modified by Mizuguchi to have hexagon shapes formed on the face shape of the light valves since this arrangement make it possible to

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reduce the angles made between the incident light beams of the respective colors and the optical axis of the micro-lens, thereby reducing the aberration of the micro-lens array.

As to claim 10, Fig. 3 of Tanaka shows that the pixels in the second row are offset from the first row (this corresponds to the light valves being disposed at a given mutual distance, and the rows being mutually offset in the transverse direction).

As to claim 11, Figs. 1a, 2, 4, 7 of Tanaka teaches the projection of all the individual light valves in the display screen.

16. Claims 12, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Au in view of Dwyer, III (US. PAT. NO. 5,281,960).

As to claim 12, Au teaches each of fibers is illuminating the face shape (34) of the light valves (the output end of each fiber 16 corresponds to the illumination head). Au does not disclose the illumination head and the illumination face is adapted to perform a relative movement across an illumination area, and a control unit for controlling the light valves in dependence on the relative movement between the illumination head and the illumination face. However, Dwyer, III teaches a display device for generating an image on the display having a plurality of light sources (Fig. 2), the pixels provided by the light sources are imaged on the display upon a fiber optic bundle. Dwyer, III also discloses the device comprising an actuator for controlling the relative movement between the array of light emitting points from the fiber optic bundle and the illumination face, and the actuator relies upon the successive selection of apertures within a light valve cell to pass light from an image source (see Fig. 2, 6, 20, 21, and col. 15, lines 44-49, col. 22, line 66 to col. 23, line 68 for example). Thus, it would have been

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obvious to one having ordinary skill in the art at the time the invention was made to modify Au's illumination unit to perform a relative movement between the illumination head and the illumination face and have a control unit for controlling the light valves as taught by Dwyer, III, since the apparent resolution of the displayed image is increased without increasing the resolution or size of the display source used to generate the image (col. 4, lines 57-60 of Dwyer, III).

As to claim 13, Figs. 12 and 13 of Dwyer, III shows the movement of the light emitting point through a succession of positions (this corresponds to illumination system movable relative to the illumination face in a single progressing movement transverse to a direction).

17. Claims 16, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Au in view of Lee (US. PAT. NO. 3,553,364).

Au does not disclose the light valves comprising electromechanical light valves. Lee teaches an electromechanical light valve device relating to light transmission or light reflection control, and more particularly to a light valve for controlling the transmission or the reflection of light by means of an electrostatic charge. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the light valves of Au to comprising an electromechanical light valves as taught by Lee so as to provide a light valve isolated from surrounding electrostatically generated forces, thereby reducing "crosstalk". (col. 1, lines 35-36 of Lee).

Response to Arguments

18. Applicant's arguments with respect to claims 1-22 have been considered but are moot in view of the new ground(s) of rejection.

Objection to the specification is maintained since the amendment to the specification failed to remove references to the claims, e.g. recitations like "as stated in claim 1", etc. should be removed from the specification to avoid confusion, on pages 3-10 of the specification.

Applicant's remarks regarding Gulick on pages 14-15 are not persuasive. This application claims priority under 35 U.S.C 119 (a) to both Danish Patent application Nos. 0415/97 filed on 4/14/1997 and 0063/98 filed on 1/16/1998. However, the claimed subject matter in this application is only supported by Danish Patent application No. 0063/98 filed on 1/16/1998, the priority application of Danish Patent application No. 0415/97 filed on 4/14/1997 does not provide support for the claimed subject matter. Therefore, this application has a priority filing date of January 16, 1998 and does not remove Gulick from being a valid reference. Gulick has an effective U.S filing date of June 5, 1997, thus, Gulick is a valid 102(e) reference.


19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Regina Liang whose telephone number is (571) 272-7693. The examiner can normally be reached on Monday-Friday from 8AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard, can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR


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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Regina Liang
Primary Examiner
Art Unit 2674

5/24/05



PATRICK N. EDOUARD
SUPERVISORY PATENT EXAMINER